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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Tetsuro Tojo

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06/24/2010

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EXAMINER

DINH, BACH T

ART UNIT

PAPER NUMBER

1795

NOTIFICATION DATE

DELIVERY MODE

06/24/2010

ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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<b>Office Action Summary</b>	<b>Application No.</b> 10/702,646	<b>Applicant(s)</b> TOJO ET AL.	
	<b>Examiner</b> BACH T. DINH	<b>Art Unit</b> 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 19 May 2010.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-9 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                    | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)         | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 05/19/2010 has been entered.

### ***Summary***

2. This is the response to the communication filed on 05/19/2010.
3. Claims 1-9 remain pending in the application.

### ***Claim Rejections - 35 USC § 112***

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claim 1 recites the limitation "the side downstream" on line 11. There is insufficient antecedent basis for this limitation in the claim.
6. Claim 4 recites the limitation "the electrolytic bath" on line 6. There is insufficient antecedent basis for this limitation in the claim.
7. Claim 4 recites the limitation "the side downstream" on line 11. There is insufficient antecedent basis for this limitation in the claim.

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8. Claim 6 recites the limitation "the electrolytic bath" on line 6. There is insufficient antecedent basis for this limitation in the claim.

9. Claim 6 recites the limitation "the side downstream" on line 11. There is insufficient antecedent basis for this limitation in the claim.

### ***Claim Rejections - 35 USC § 103***

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

12. Claims 1-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tojo et al. (WO 01/77412) with equivalent English translation provided by Tojo et al. (US 6,818,105) in view of Saito et al. (US 6,383,300).

The recited limitations "an inert gas substitution means for" of claims 1, 4 and 6 and "a detecting means for" in claim 2 and 7 invoke 35 U.S.C. 112, sixth paragraph. According to the specification, the inert gas substitution means includes the inert gas feeding line 91,

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the inert gas storage tank 92, the second automatic valve 73, the first automatic valve 74, and an HF feeding interruption detecting means (see specification on page 6). According to the specification, the first level sensing means 5 and the second level sensing means 6 constitutes the HF feeding interruption detecting means (see specification on page 9).

Addressing claims 1, 4 and 6, Tojo discloses a fluorine gas generator for generating fluorine gas by electrolyzing an electrolyte comprising a hydrogen fluoride containing mixed molten salt (14:22-25), which generator is equipped with:

A hydrogen fluoride gas feed line (figure 3, HF supply line, 10:64), one end of which is connected to a hydrogen fluoride gas supply source (10:53, the hydrogen fluoride gas is continuously fed; therefore, it is inherent that the hydrogen fluoride gas supply line is connected to a hydrogen fluoride gas supply source) and the other end of which is connected to a hydrogen fluoride gas inlet disposed in an electrolyte in the electrolyte bath (in figures 3-4, the HF supply line has one end or the inlet disposed in the electrolyte 3 in the electrolytic bath), for feeding hydrogen fluoride gas into the electrolyte as required by claim 1 and the electrolytic bath as required by claims 4 and 6,

A first automatic valve disposed one the hydrogen fluoride gas feed line (10:60-65, solenoid valve) and capable of being closed on the occasion of interruption of hydrogen fluoride gas feeding (10:65-11:11, the solenoid valve is automatically closed; therefore, the valve is capable of being closed on any occasions including the occasion of interruption of hydrogen fluoride gas feeding), and

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An inert gas substitution means for eliminating the hydrogen fluoride gas remaining in at least part of the line on the side downstream from the first automatic valve on the hydrogen fluoride feed line, which part is located downstream from the first automatic valve and upstream of the hydrogen fluoride gas inlet, and substituting an inert gas thereof on the occasion of interruption of hydrogen fluoride gas feeding (9:38-50, inert gas tank 18, inert gas feed line, valves 62 and 54 of the inert gas supply line and the liquid level probes 8 and 9 constitute the claimed inert gas substitution means; furthermore, when electrolysis is halted, which also means the supply of hydrogen fluoride gas is also halted, the whole system is purged by the inert gas; therefore, the hydrogen fluoride gas remaining in the line downstream from the solenoid valve and upstream from the hydrogen fluoride inlet is also eliminated), Tojo further disclose the inert gas substitution means comprises an inert gas feed line (figures 3-4).

Tojo is silent regarding the inert gas feed line is directly connected to the hydrogen fluoride feed line.

Saito discloses a heat treatment apparatus; wherein, inert nitrogen gas is used to purge the apparatus by opening valves VB3 and VB3 while closing other valves (13:53-62).

Furthermore, the inner nitrogen gas feed lines is connected to the N<sub>2</sub> gas source 36a and connected to the reactive gas feed line at a location downstream from the automatic valve VB1 (figure 1).

Tojo and Saito are analogous arts for they disclose apparatuses that use inert gas for purging. At the time of the invention, one with ordinary skill in the art would have found

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it obvious to modify the apparatus of Tojo by connecting the inert gas feed line directly to the reactive HF feed line like that of Saito because doing so would allow one to completely purge the apparatus including the HF feed line. Furthermore, one with ordinary skill in the art would have achieved the predictable result of purging the fluorine generating apparatus when applying the known technique of purging an apparatus by connecting the inert gas feed line to the reactive gas feed line downstream from the automatic valve of Saito to the known fluorine generating apparatus of Tojo. Therefore, the modified apparatus of Tojo with the inert gas feed line connected to the HF feed line on the side downstream from the solenoid valve would effectively purge or eliminate the hydrogen fluoride gas remaining in at least a part of the HF gas feed downstream from the automatic valve and upstream from the HF gas inlet.

Regarding the recited limitation “substituting an inert gas thereof in case of emergency in the fluorine gas generator” of claim 4, Tojo discloses when the electrolysis is halted or in case of emergency, the apparatus is purged (9:43-45). Therefore, the disclosure of Tojo reads on the limitation recited above of instant claim.

Regarding the recited limitation “substituting an inert gas thereof in case the first automatic valve is closed” of claim 6, Tojo discloses the level probes 8 and 9 halt electrolysis when they detect a fluctuation limit (7:12-14) and purge the apparatus with inert gas when the electrolysis is halted (9:37-51). Furthermore, Tojo discloses the liquid level probe (liquid level probe disclosed in 11:2-10) detects fluctuation in the cathode chamber and sends out a signal to close the solenoid valves when such scenario occurs (11:2-11). Therefore, Tojo discloses when a fluctuation occurs, electrolysis is halted, the

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solenoid valve on the HF feed line is automatically closed and the whole system is purged with inert gas, which meets the above limitation of current claim.

Addressing claims 2, 5 and 7, Tojo discloses liquid level probes 8 and 9 which constitute the claimed "a detecting means for detecting interruption of feeding of the hydrogen fluoride gas". Tojo further discloses a second automatic valve (solenoid valve 54, figures 3-4) disposed on the inert gas feed line and operated in association with the detecting means to feed the inert gas (7:18-27, the solenoid valve 54 is opened or closed in accordance with the detection results obtained from the level probes 8 and 9). Tojo discloses an inert gas storage tank 18 (figure 1) for storing the inert gas to be fed.

Saito discloses the inert gas feed line is provided for feeding the inert gas to the reactive gas feed line on the side downstream from the automatic valve VB1 (figure 1, the inert gas feed line is connected to the reactive gas feed line on the side downstream from the automatic valve VB1); the inert gas feed line further comprises a second automatic valve VB3 and operated in association with the automatic valve VB1 to feed the inert gas into the reactive gas feed line on the side downstream from the automatic valve VB1 (11:52-59, after the completion of the film, VB1 and VB2 are closed; 12:40-49 and 13:53-62, VB3 and VB4 are opened when all the other valves are closed in order to purge the system).

In conjunction with the rejection of claims 1, 4 and 6, the modified apparatus of Tojo with the connectivity of Saito would have the inert gas feed line connected to the HF feed line on the side downstream from the solenoid valve (solenoid valve disclosed in 10:57-



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65) and the automatic valve 54 of the inert gas feed line operates in association with the level probes 8 and 9 to feed inert gas into the HF feed line on the side downstream from the solenoid valve (7:18-27, the solenoid valve 54 is opened or closed in accordance with the detection results obtained from the level probes 8 and 9; therefore, when the solenoid valve 54 is opened, inert gas would be fed into the HF feed line on the side downstream from the solenoid valve).

Addressing claims 3, 8 and 9, Tojo discloses an inert gas storage tank 18 (figure 1) for storing the inert gas to be fed.

### ***Response to Arguments***

13. Applicant's arguments filed 05/19/2010 have been fully considered but they are not persuasive.

With respect to the Applicant's argument regarding the 35 U.S.C. 112, second paragraph rejection of claims 4 and 6, the claims have been amended; however, the amendment still does not cure the lack of antecedent basis as stated in the previous Office Action. The rejection is reiterated above.

With respect to Applicant's argument regarding the 35 U.S.C. 103(a) rejections of claims 1-9 as being unpatentable over the disclosures of Tojo and Saito, the argument is not persuasive for the following reasons. Firstly, with respect to Applicant's assertion that the inert gas line having valve 73 does not correspond to the "inert gas substitution means

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... downstream of said first automatic valve", Examiner acknowledges Applicant's reasoning. However, the originally filed specification specifically recites that the inert gas feed line 91, the inert gas storage tank 92, the second automatic valve 73, the automatic valve 74 and an HF feeding interruption detecting means constitute an inert gas substitution means. Applicant is respectfully requested to clarify the discrepancy between the content of the originally filed specification and the assertion made in the Remarks. Additionally, Examiner did not indicate in the previous Office Action that the purge gas inlet corresponds to the inert gas substitution means. Therefore, according to the structures disclosed by the originally filed specification that constitute the inert gas substitution means, the disclosure of Tojo shows all the required structures of the inert gas substitution means as articulated in the Office Action. Furthermore, as shown in figures 1-2, there are occasions when the HF gas inlet is not disposed in the electrolyte, during which the step of purging the system would eliminate the HF gas remaining in at least part of the line on the side downstream from the first automatic valve and upstream from the HF gas inlet.

Secondly, with respect to Applicant's argument regarding analogous arts, Examiner respectfully disagrees for both Tojo and Saito disclose using the inert gas to purge the whole system, including eliminating HF gas (Saito, 15:66-16:9), which is reasonably pertinent to the problem with which the Applicant was concerned. Furthermore, in the apparatus of Saito, the gas contained in gas sources 35a and 35b are the reactive gases, similar to the HF gas as the reactive gas in the apparatus of Tojo. Although Saito does not experience the same problem of current application, but the

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purging configuration of Saito is applicable to that of Tojo because the connection between the inert gas feed line disclosed by Tojo allows the purging of the reactive gas from the reactive gas feed line, including the portion downstream from the cut off valve, as well as the whole system; therefore, connecting the inert gas feed line directly to the HF feed line of Tojo would accomplish the same result of completely purging the HF feed line as well as the whole system. Therefore, Examiner maintains the position that Tojo and Saito are analogous arts.

Thirdly, with respect to Applicant's assertion that the discussed modification would render the prior art unsatisfactory for its intended purpose, Examiner respectfully disagrees. The discussed modification did not call for taking the inert gas feed line disposed in the inlet 15 of Tojo and connect said gas feed line to the HF feed line. The modification simply calls for connecting the inert gas feed line to the HF gas feed line, this is consistent with the disclosure of Tojo where the inert gas feed line is divided into many branches; therefore, creating a branch that is connected directly to the HF feed line is well within the technical grasp of one with ordinary skill in the art reading the disclosure of Tojo. Therefore, such modification would not render the pressure keeping means 50 unsatisfactory for its intended purpose.

Fourthly, with respect to Applicant's argument regarding the unpredictable result of preventing the inflow of electrolyte into the HF feed line, the argument is not persuasive. Applicant asserted that the backflow mentioned by Tojo is that into the gas discharge ports 14, 16 and not backflow into the HF feed line, Examiner respectfully disagrees because the backflow of electrolyte would reach the HF gas inlet before it

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reaches the gas discharge ports 14 and 16. As shown in figures 1-4, the HF feed line inlet is located closer to the upper surface of the electrolyte than the gas discharge ports 14 and 16. Therefore, even if Tojo is not explicit regarding the back flow affecting the HF feed line inlet, it is apparent from the disclosure of Tojo that the back flow would reach the HF feed line inlet before it reaches the discharge ports. Furthermore, the back flow is originated from the lack of equalization in the pressure between the cathode and the anode chamber; specifically, the level of electrolyte would rise when the pressure within the anode or cathode chamber decreases, which is analogous to the concern of negative pressure of current application.

For the reasons stated above, Examiner maintains the position that the limitations of claims 1-9 are obvious over the combined disclosures of Tojo in view of Saito and such modification would produce the inert gas substitution means for eliminating HF gas remaining in at least part of the line located downstream from the first automatic valve and upstream of the HF gas inlet disposed in the electrolyte.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to BACH T. DINH whose telephone number is (571)270-5118. The examiner can normally be reached on Monday-Friday EST 7:00 A.M-3:30 P.M.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam X. Nguyen can be reached on (571)272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Nam X Nguyen/  
Supervisory Patent Examiner, Art Unit 1753

BD  
06/18/2010